What is claimed is:

1. A method of ligating a double-stranded region (ds region) end and a single-stranded region (ss region) end of a double-stranded DNA, the method comprising contacting, under the presence of a homologous recombinant protein, the ss region end of a double-stranded DNA having an ss region end, and the ds region end of a double-stranded DNA having a ds region end comprising a sequence that is homologous to said ss region nucleotide sequence to form a three-stranded DNA structural complex comprising said ss region end and said ds region end.

2. The method of ligation of claim 1, wherein said three-stranded DNA structural comples is a circular DNA complex having a three-stranded structure in two positions, made by the ligation of a double-stranded DNA comprising an ss region end at both ends, and a double-stranded DNA having at both ends, ds region ends comprising sequences that are respectively homologous to the above mentioned ss nucleotide regions, or the ligation of a double-stranded DNA comprising an ss region end and a ds region end, and a double-stranded DNA comprising a ds region end having a sequence that is homologous to the nucleotide sequence of the above mentioned ss nucleotide region and an ss region end comprising a sequence that is homologous to the nucleotide sequence of the above mentioned ds nucleotide region.

3. The method of ligation of claim 2, wherein the nucleotide sequences of the two ss regions are mutually non-complementary.

4. The method of ligation of claim 2, wherein the two ss region ends are within the same double-stranded DNA.

5. The method of ligation of claim 2, wherein one DNA is capable of conferring the ability of auto-replicating within competent cells.

6. The method of ligation of claim 5, wherein the other DNA

comprises the whole or part of the gene to be cloned.

7. The method of ligation of claim 1, wherein the nucleotide sequence of the ss region is at least 6mer.

8. The method of ligation of claim 1, wherein the homologous recombinant protein is selected from a group consisting of the Rec A protein and proteins that are functionally similar to the Rec A protein.

9. The method of claim 1, wherein the contact is done furthermore under the presence of nucleoside triphosphate or a derivative thereof.

10. The method of ligation of claim 1, further comprising a step of converting the three-stranded structure formed to a double-stranded structure.

11. The method of ligation of claim 10, wherein the conversion of the three-stranded structure to a double-stranded structure is done by inserting a DNA complex comprising a three-stranded structure into cells.

12. The method of ligation of claim 11, wherein the insertion of a DNA complex comprising a three-stranded structure into cells is done by electroporation.

13. The method of ligation of claim 10, wherein the conversion of the three-stranded structure to a double-stranded structure is done by a nucleic acid modification enzyme.

14. The method of ligation of claim 1, further comprising steps of converting the three-stranded structural portion into a double-stranded structure by treating the DNA complex having the three-stranded structure with endonuclease in advance, and then inserting this into cells, and culturing the transformant thus obtained to amplify DNA.

15. A DNA constituent comprising at least one three-stranded structural portion comprising a single-stranded region (ss region) end and a double-stranded region (ds region) end comprising a sequence that is homologous to said ss region nucleotide sequence.

16. The DNA constituent of claim 15, which is circular.

17. The DNA constituent of claim 15, wherein the constituent

comprises two three-stranded structural portions, and the ss region nucleotide sequences forming these structural portions are mutually non-homologous.

18. The DNA constituent of claim 15, wherein each ss region nucleotide is at least 6 mer.

19. The DNA constituent of claim 15, wherein the three-stranded structural portion forms a complex with a homologous recombinant protein.

20. The DNA constituent of claim 15, wherein one double-stranded DNA segment sandwiched between two three-stranded structural portions, is capable of conferring the ability of auto-replicating within competent cells, and the other double-stranded DNA segment comprises the whole or part of the gene to be cloned.

21. A gene-cloning kit comprising the following components:

(A) a DNA, which is a double-stranded DNA comprising a single-stranded region (ss region) at both ends, wherein the nucleotide sequences of these ss regions are mutually non-complementary, and furthermore comprises a DNA sequence capable of conferring to the double-stranded region, the ability of auto-replicating within competent cells;

(B) an oligonucleotide primer comprising as a part of the 5' end sequence, a sequence that is complementary to the one ss region nucleotide sequence of (A), and furthermore, a part of the sequence of one end of the gene to be cloned, and;

(C) an oligonucleotide primer comprising as a part of the 5' end sequence, a sequence that is complementary to the other ss region nucleotide sequence of (A), and furthermore, a part of the sequence of the end, which is different to that in (B), of the gene to be cloned.

22. The kit of claim 21, wherein the nucleotide sequence of each ss region is at least 6 mer.